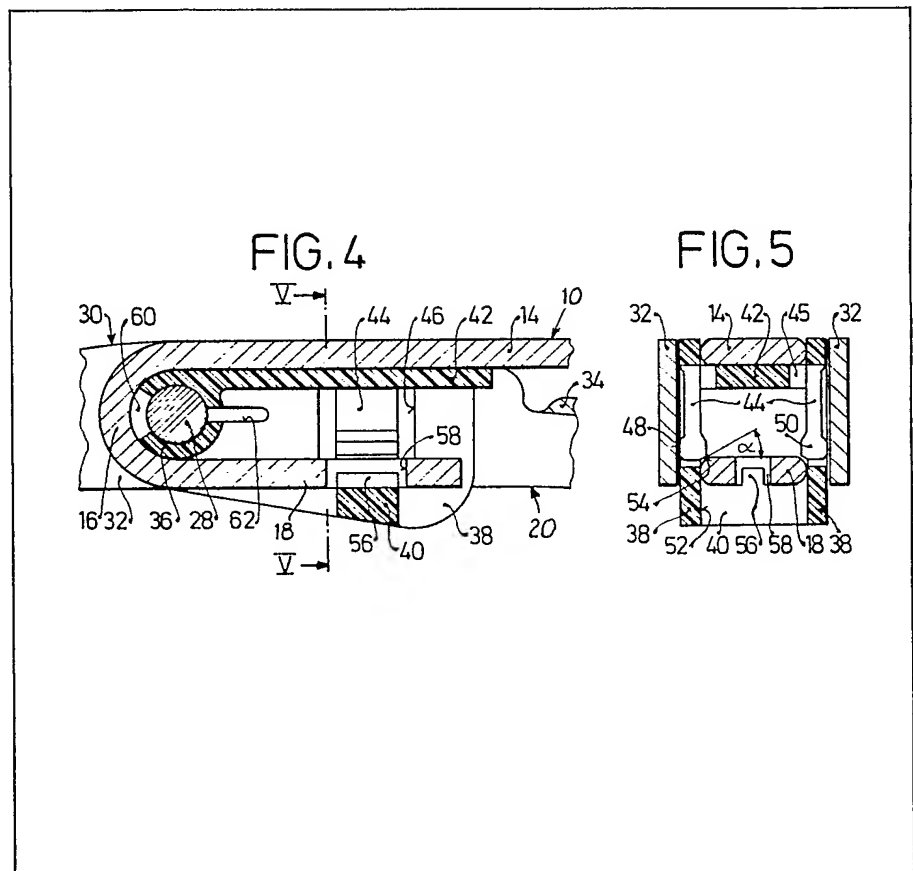


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(54) **Connecting wiper blade to wiper arm**

(57) A wiper blade (20) is connected to a hooked end of a wiper arm (10) by means of a connection element (26) which fits on a pivot pin (28) of the wiper blade. The connection element has two parallel walls (38) which are interconnected by hub (36), and a bridge portion (40). The hub is embraced by the apex (16) of the hook and each wall of the connection element covers a respective side of the two limbs (14,18) of the hook. Resiliently deflectible tongues (44) are disposed in the walls (38) and form latch means which engage that side of the free limb (18) of the wiper arm which is remote from the bridge portion (40) when the outside of the said limb of the wiper arm abuts against the bridge portion.



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FIG. 1

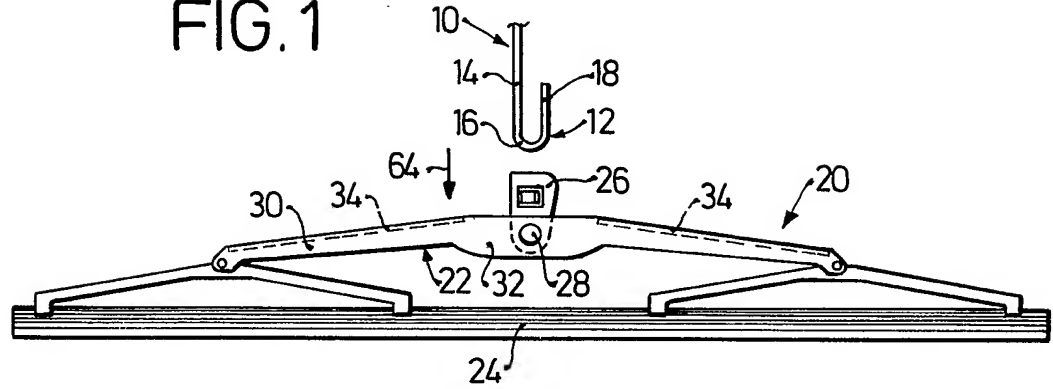


FIG. 2

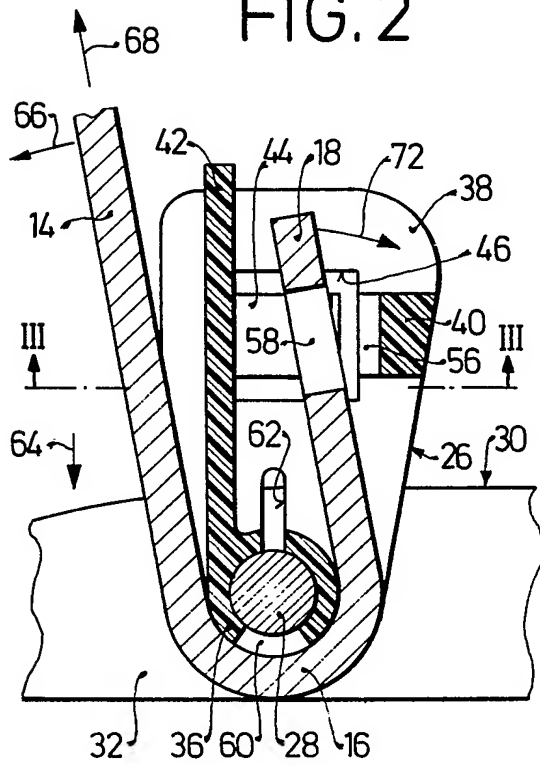
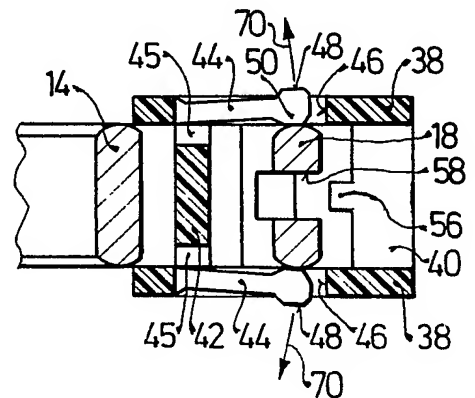


FIG. 3



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FIG. 4

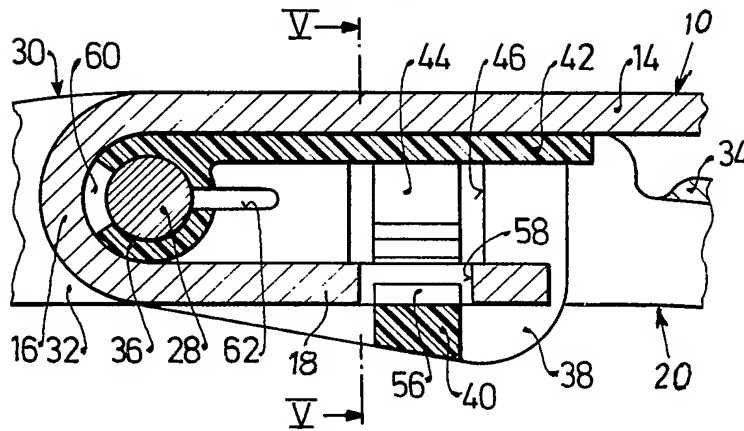


FIG. 5

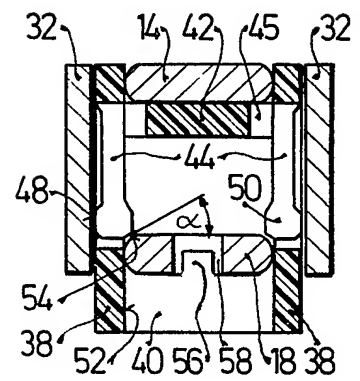


FIG. 6

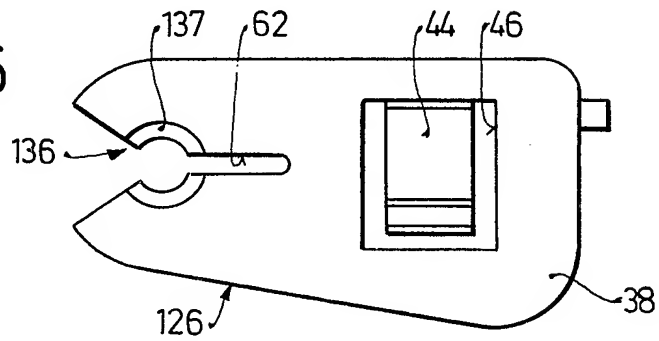
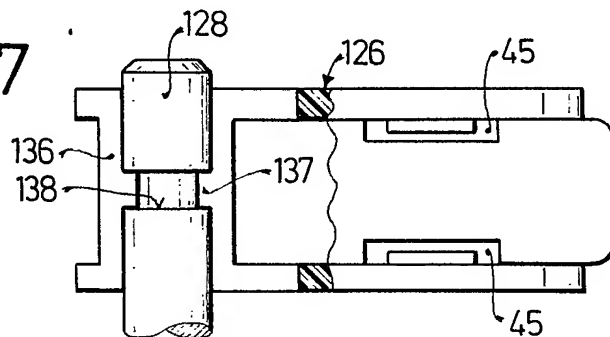


FIG. 7



SPECIFICATION

Screen wiper for motor vehicles

5 The invention relates to a screen wiper for motor vehicles in which a wiper blade is attached to a driven wiper arm by means of a connection element which is pivoted to the wiper blade and a connection hook which is provided at the free end of the wiper arm and which is hooked about the connection element.

10 A screen wiper is already known in which deflectible latch hooks are mounted on the walls of the connection element and act on the side edges of one of the limbs of the connection hook. The overall height of the wiper blade connected to the wiper arm is thereby rendered unnecessarily large, this being particularly disadvantageous when the wiper blade is located below a cover in its parked position, since, in this case, the cover has to be disposed at an unnecessarily great height above the screen to be wiped.

The present invention resides in a screen wiper for motor vehicles, comprising a wiper blade and a driven wiper arm which has a bar on whose free end is formed a connection hook releasably secured to a connection element articulated to a pin connected to the wiper blade, wherein the connection element has two at least approximately parallel, spaced walls which overlie respective side edges of two limbs of the connection hook and which are interconnected by a hub which is pivoted about the pivot pin and which is embraced by the apex of the hook, and has a web portion which interconnects the walls and abuts externally against one limb of the hook-shaped end and wherein at least one wall of the connection element is provided with at least one resiliently outwardly deflectible latching tongue which acts upon a side edge of one of the limbs of the connection hook remote from the bridge portion, the latching tongue being arranged within the associated wall and being free along three sides, a rest shoulder on the tongue co-operating with one of the limbs of the connection hook.

This construction of wiper has the advantage that the wiper blade connected to the wiper arm has a smaller overall height, since the latch tongues are integrated in the walls of the connection element. Furthermore, when in their assembled state, the wiper arm and the wiper blade can be unreleasably interengaged and secured by the latch tongues of the connection element and side flanges of a U-shaped section yoke of the wiper blade.

The invention will be further described by way of example, with reference to the drawings, in which:-

55 *Figure 1* is an elevation of a wiper blade having a connection element, and shows part of a wiper arm, *Figure 2*, drawn to a larger scale, is a fragmentary section through the wiper blade, the connection element and the wiper arm, the wiper blade being only partially connected to the wiper arm,

60 *Figure 3* is a section taken on the line III-III of *Figure 2*,

Figure 4 is a section corresponding to *Figure 2*, the wiper blade being connected to the wiper arm by means of the connection element,

Figure 5 is a section taken on the line V-V of *Figure 4*,

Figure 6 is a side elevation of a different embodiment of connection element, and

70 *Figure 7* is a plan view, partially sectioned, of the connection element being mounted on a pivot pin.

A wiper includes a wiper arm having a bar 10 whose free end is in the form of a connection hook 12. Thus, the bar 10 merges into one limb 14 of the connection hook 12 to which the hook apex 16 is contiguous. The second, free limb 18 of the hook is then contiguous to the hook apex 16 (*Figure 1*). A wiper blade 20 is connectible to the connection hook 12 and chiefly comprises a carrier yoke frame 22, a rubber wiper blade 24 held by the yoke frame, and a connection element 26 which articulated to a pin 28 connected to the yoke frame 22. The frame portion 30 of the yoke frame 22 carries the pin 28 and is of U-shaped cross section and the pin 28 is held in the two limbs or flanges 32 of the U-shape. Furthermore, the bridge portion or web 34, interconnecting the two limbs 32 of the frame portion 30, is cut away in the region of the pin 28, so that the frame portion 20 only has the two side walls 32 in this region. The connection element 26 is thereby freely pivotable on the pin 28.

The connection element 26 has a hub 36 (*Figures 2 and 4*) by means of which its two parallel walls 38 are interconnected. The distance between the walls 38 is such that the connection element 26 is located without a large amount of play between the two side walls 32 of the frame portion 30. The walls 38 of the connection element 26 are interconnected by means of a bridge portion 40 which is disposed at a distance from the hub member 36. Furthermore, the connection element has a stiffening web 42 which is arranged at a distance from the bridge portion 40 which interconnects the walls 38 of the connection element 22. Finally, the stiffening web 42 is connected to the hub 36. A tongue 44, which is free along three sides, is provided in each wall 38 and is spaced from the hub 36. In order to provide the connection element with a stable construction, the two tongues 44 are located in the same cross sectional region of the connection element 26 as the bridge portion 40. The tongues 44 are prevented from coming into contact with the respective walls 38 by the provision of respective U-shaped slots 46. The outside of each tongue 44 has a support shoulder 48 which, in the free state, is located approximately in the same plane as the outer surface of the wall 32. The inside of each tongue 44 is provided with a projection 50. The projections 50 protrude beyond the mutually facing surfaces 52 of the walls 38, and the shoulders 54 facing the bridge portion 40 serve to engage and secure the connection hook 12 in the connection element 26. The shoulder surfaces 54 are arranged such that they form an acute angle α with the bridge portion 40 and with a limb 18 of the connection hook 12 which is located in the connection element. Furthermore, the bridge portion 40 of the connection element 26 has a safety lug 56 which projects towards the tongues 44 and which is associated with a recess 58 in the limb 18 of the wiper arm. In order to improve the extent to which the tongues 44 can be deflected, the stiffening web 42 is provided with openings 45 in the region of the ton-

gues 44. Furthermore, the hub 36 of the connection element 26 is provided with an insertion opening 60 for the pivot pin 28. Slots 62 lead into the walls 38 from that side of the bore of the hub 36 which is 5 remote from the insertion opening 60. The connection element 26 is manufactured from a resilient plastics material, so that the insertion opening 60, which is smaller than the diameter of the pin 28, can be temporarily dilated in order to locate the pin 28 in the 10 bore of the hub 36. The dimension of the bore in the hub 36 is such that the connection element 26 can rotate freely on the pin 28.

In order to connect the wiper blade 20 to the wiper arm, the connection element 26 is put into the position illustrated in Figure 2, and the bar 10 of the wiper arm is then pushed through in the direction of the arrow 64 between the bridge portion 34 of the frame portion 30, the connection element 26 and the two walls 38 of the frame portion 30, until the entire connection hook 12 is located below the pin 28. The wiper arm is then swung in the direction of the arrow 66, care having to be taken that the free limb 18 of the connection hook 12 will be located between the bridge portion 40 and the stiffening bar 42. The wiper 25 arm is then pulled upwardly in the direction of the arrow 68 until it assumes the position shown in Figure 2. When in this intermediate assembly position illustrated in Figures 2 and 3, the free limb 18 of the connection hook 12 engages inwardly against the 30 projections 50 of the tongues 44 which are thereby pressed outwardly in the direction of the arrows 70. When the wiper arm is pivoted in the direction of the arrow 72 (Figure 2, the free limb 18 of the hook abuts against the bridge portion 40, and the other limb 14 of 35 the hook abuts against the stiffening web 42 (Figures 4 and 5). The safety lug 56 on the bridge portion 40 thereby enters the recess 38 in the free limb 18 of the wiper arm hook. The wiper blade 20 is thereby prevented from being unintentionally released from the 40 connection hook 12 of the wiper arm. When in the assembled position illustrated in Figure 4, the apex 16 of the connection hook 12 embraces the hub 16 at the side at which the insertion opening 60 for the pin 28 is located. When the outside of the free limb 18 of the 45 connection hook 12 comes into abutment against the bridge portion 40, the tongues 44, pressed outwardly under prestress, are released and spring back in the opposite direction to the arrows 70 to their initial positions (Figure 5). The safety shoulders 54 thereby 50 come into abutment against the side of the free limb 18 remote from the bridge portion 40. The free limb 18 of the connection hook 12 is then engaged between the bridge portion 40 and the shoulders 54 of the tongues 44. By virtue of the fact that the connection 55 element 26 is pivoted between the side walls 32 of the frame portion 30 when the wiper is in its operating position, the tongues 44 are prevented from being deflected again in the direction of the arrows 70, since the support shoulders 48 of the tongues 44 come into 60 abutment with the interior frame of the side walls 32. In order to release the wiper blade 20 from the wiper arm, the wiper blade first has to be pivoted transversely of the wiper arm. The wiper arm 14 can then be swung in the direction of the arrow 66, since the 65 now exposed tongues 44 can spring outwardly again

in the direction of the arrows 70, whereby the free limb 18 of the connection hook 12 is unlocked. In order to release the wiper blade 20 from the connection hook 12, the wiper blade is raised in the direction 70 of the arrow 68 until the hub 36 of the connection element 20 is disengaged from the hook. The wiper blade 20 can then be removed from the wiper arm by pulling it in the direction of the arrow 64, whereupon the connection hook 12 is again removed from the 75 assembly passage surrounded by the side walls 32, the connection element 26 and the bridge portion 34, and is fully released from the wiper blade 20.

In the embodiment illustrated in Figures 6 and 7, the connection element 126 substantially corresponds 80 ponds to the connection element 26 of the embodiment just described. The only difference is that the bore in the hub 136 has arcuate projections 137 which engage an annular groove 138 in a pivot pin 128. This has the advantage that the connection element 126 is 85 secured in the axial direction of the pivot pin 128 even when the latter is not located between side walls of a frame portion, but, for example, projects laterally from the frame portion.

90 CLAIMS

1. A screen wiper for motor vehicles, comprising a wiper blade and a driven wiper arm which has a bar on whose free end is formed a connection hook 95 releasably secured to the wiper blade, wherein the connection element has two at least approximately parallel, spaced walls which overlie respective side edges of two limbs of the connection hook and which are interconnected by a hub which is pivoted about 100 the pivot pin and which is embraced by the apex of the hook, and has a web portion which interconnects the walls and abuts externally against one limb of the hook-shaped end and wherein at least one wall of the connection element is provided with at least one resiliently outwardly deflectible latching tongue which 105 acts upon a side edge of one of the limbs of the connection hook remote from the bridge portion, the latching tongue being arranged within the associated wall and being free along three sides, a rest shoulder on the tongue co-operating with one of the limbs of the connection hook.

2. A screen wiper as claimed in claim 1 in which the rest shoulder and the side of the hook limb associated therewith are at an acute angle to one 115 another.

3. A screen wiper as claimed in claim 1 or 2, in which the bridge portion and the latching tongue co-operate with the free limb of the connection hook.

4. A screen wiper as claimed in any of claims 1 to 3, 120 in which a respective latching tongue is provided in each wall of the connection element, and the tongues and the bridge portion are located in the same cross-sectional region of the connection element.

5. A screen wiper as claimed in claims 3 or 4, in 125 which the connection element has a stiffening web which is connected to its walls and which abuts against the interior surface of that hook limb which is contiguous to the wiper arm bar and which is located opposite the free limb of the hook.

6. A screen wiper as claimed in claim 5 in which 130

the stiffening web is connected to the hub.

7. A screen wiper as claimed in any of claims 1 to 6, in which the bridge portion has in its central region between the walls of the connection element a safety lug which projects towards the latching tongues.

8. A screen wiper as claimed in any of claims 1 to 7, in which that side of the hub which the apex of the hook overlies has an expansible insertion opening for the pivot pin of the wiper blade.

9. A screen wiper as claimed in any of claims 1 to 8, in which the wiper blade has a yoke portion of U-shaped cross section, the pivot pin being arranged between the limbs of the frame portion and in which the outsides of the resilient tongues have support shoulders which abut against the interior surfaces of the side walls of the yoke portion when the wiper is ready for use.

10. A screen wiper as claimed in any of claims 1 to 9, in which the pivot pin has an annular groove and the bore of the hub has at least one projection which engages in the annular groove.

11. A screen wiper as claimed in any of claims 1 to 10, in which the connection element is manufactured from a resilient plastics material.

12. A screen wiper as claimed in claim 11 in which the connection element is injection-moulded.

13. A screen wiper constructed substantially as herein described with reference to the drawings. reel in a safety belt (6), a housing (7) comprising a chamber containing a rotor (18) rotatable to drive the reeling means, means (13) for receiving an explodable charge, and a container (9) having an outlet openable to communicate with the chamber. The container (9) is adapted to contain a body of fluid so interposable between the rotor and such charge as to be expelled in such a manner from the container (9) by energy released by explosion of such charge (15) as to rotate the rotor (18) and thereby reel in the belt. Rotor (18) may be replaced by two meshed rotors.